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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,489	09/27/2001	Richard C. Chu	POU920010084US1	3745

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EXAMINER	
LAM, CATHY FONG FONG	
ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

YB

Office Action Summary	Application No.	Applicant(s)	
	09/965,489	CHU ET AL.	
	Examiner	Art Unit	
	Cathy Lam	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *August 27th 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

In view of the amendment and remarks filed on August 27th 2003, the claims are continued to be unpatentable as following:

Claim Rejections - 35 USC § 102/103

1. Claims 1-6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gungor et al (US 5944097).

Gungor discloses a substrate carrier (10) which is placed between electronic device(s) (18) and a heat sink (14) (Fig. 2).

The substrate carrier is a composite material which is thermally compatible with the electronic ceramic substrate on which the electronic devices are formed.

The substrate carrier comprised of an aluminum matrix reinforced with ceramic particulates such as silicon carbide, boron carbide, diamond powder or graphite fibrous material (col 2 L 60-64). The substrate carrier includes openings in the thickness direction, and copper based inserts are placed in the openings (col 2 L 64-65). The copper based insert can be a copper based diamond particle reinforced composite (col 4 L 42-43). The copper based inserts come in various shapes and sizes (col 3 L 11-12).

The examiner takes the position that the copper based inserts are analogous to the conduits of the present invention.

Gungor is silent about the thermal conductivities between the surface of the carrier and the side wall of the carrier. Furthermore, from the figures of Gungor the copper based inserts are not all circular cross sectioned nor are they equally spaced.

Gungor's substrate carrier which comprises the same ingredients and similar structure as the present invention, it would be obvious that the thermal conductivity in

the vertical direction would be greater than the horizontal direction because the copper based inserts which are highly thermal conductive, are placed below the heat generating devices (18) (col 4 L 36-40).

Claim Rejections - 35 USC § 103

2. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gungor et al (US 5944097) in view of Eckblad et al (US 6407922).

Gungor discloses a substrate carrier which is used to dissipate heat from electronic devices.

Gungor however is silent about having an adhesive layer and a thermal paste for bonding the substrate carrier (or heat spreader) to the electronic devices and the heat sink, respectively.

Eckblad teaches a heat spreader (5) which is placed between a semiconductor chip (3) and a heat sink (7). The heat spreader is comprised of carbon nanotubes and an organic or inorganic matrix (col 3 L 20-22).

The heat spreader is bonded to the semiconductor chip (3) and the heat sink (7) through a thermally conductive adhesive (col 5 L 44-48).

Eckblad is silent about the ingredients used for the thermally conductive adhesive, however one skill in the art would choose a suitable material for the invention because it is a matter of design choice.

Regarding to the conduits that extend into the adhesive layer and the thermal paste, such feature would be obvious because the conduits need to be in contact with

the heat source in order to maximize the heat transfer (or conductive heat transfer) (col 3 L 20-22).

Response to Arguments

1. Applicant's arguments filed on August 27th 2003 have been fully considered but they are not persuasive. Applicant traverses the art rejections and raises the following issues:

A. Claim 1 recites the substrate alone has the anisotropic thermal conductivity, not eh substrate in conjunction with the conduits.

B. The examiner characterized Gungor having a thermal conductivity in the vertical direction greater than the thermal conductivity in the horizontal direction. This is opposite to the description of claim 1.

In respond to the above issues:

A. Gungor teaches the base composite substrate is a carbon composite, which meets the present invention. It would be inherent to have the anisotropic thermal conductivity property as claimed by the applicant.

B. Claim 1 states that the substrate itself has a thermal conductivity in horizontal direction (or the 1st thermal conductivity) that is greater than the thermal conductivity in the vertical direction (or the 2nd thermal conductivity). The conductivity value of the conduit is greater than the 2nd thermal conductivity (or the vertical direction). Applicant has no clear statement stating any of thermal conductivities of the substrate with the conduits embedded. It is unclear as to whether the thermal conductivities between the first and second faces would change after the conduits were embedded.

Since the prior art meets the materials for both the substrate and the conduits claimed, it would be at least obvious if not inherent that Gungor's structure possesses the same properties.

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (703) 308-2418. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9604.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Cathy Lam

Cathy Lam
Primary Examiner
Art Unit 1775

cfl
December 12, 2003